REMARKS

Reconsideration of this application, as amended, is respectfully requested. It is submitted that the amendments do not add new matter.

The drawings are objected to as failing to comply with 37 CFR 1.84 (p)(4) and 37 CFR 1.84 (p)(5). The specification stands objected to for having informalities.

The Examiner has stated that the listing of references in the specification is not a proper information disclosure statement.

Claims 4, 7-9, 12 and 21 stand objected to for having informalities. Claims 4, 7-9, 11, 15, 18 and 20-22 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 2, 6-13, and 17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,394,436 by Meier et al. ("Meier"). Claims 3-5, 14-16 and 21-22 stand rejected under § 103(a) as being unpatentable over Meier in view of U.S. Patent No. 6,363,062 by Aaronson et al. ("Aaronson"). Claims 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Meier '436 and Examiner's asserted common knowledge within the art.

Please amend claims 1-22. Please add new claim 23.

The Examiner has objected to figure 3A as failing to comply with 37 CFR 1.84 (p)(4). The examiner states

> The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because in Figure 3A reference characters "110" and "318" have both been used to designate the "Send hello, reset hello, counter" box, reference characters "120" and "322" have both been used to designate the "Reset hello counter and send CONETS schedule packet" box and reference characters "210" and "312" have both been used to designate the "Process schedule packets in order received using NETS procedures" box.

(Office Action dated July 31, 2002, pp. 2)

Applicants respectfully submit a red line substitute drawing of figure 3A to alleviate the duplicated reference numbers.

The Examiner has objected to figures 2, 3A, 3B, and 7 as failing to comply with 37 CFR 1.84 (p)(5). The Examiner states

> The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "210" in Figure 2, "250" in Figure 3A, "330" and "360" in Figure 3B and "s0-s10", "A to D", "B to E", "C to F", "C to G", "Ch1", "Ch2" and "Ch3" in Figure 7.
> The drawings are further objected to because reference character "20" in Figure 1 does not clearly indicate a subnetwork as described in the specification.

(Office Action dated July 31, 2002, pp. 2)

Applicants respectfully submit a red line substitute drawings for figures 1, 3A, 3B to overcome the objections. Applicants also respectfully submit substitute paragraphs, as listed above, to overcome the objections to figures 2, 3A, 3B, and 7.

The Examiner has objected to the specification for having informalities. The Examiner states

> The specification does not clearly describe subnetwork 20 (p. 7, lines 22-30). Subnetwork 20, shown in Figure 1, does not indicate a structure resembling that of subnetworks 30, 40 and 50, however, the specification refers to subnetworks 20, 30, 40 and 50 collectively and does not distinguish this difference. Appropriate correction is required.
> In the description of Figure 3 beginning on page 18, line 17, the specification refers to node Y and node X, however, these reference characters are not included in Figure 3. The applicant is required to insert "a" in between "when"and "node Y" (p. 18, line 17), and/or preferably to insert the phrase "(not shown)" or an equivalent statement thereof, following the first mention of node Y and node X if applicant does not include such a reference in the figure. Appropriate correction is required.

> In the specification beginning on page 22, line 28 and continuing through to page 23, line 19, it is unclear as to what applicant is describing. Particularly, it is unclear whether applicant is describing Figure 7, Figure 1 or both figures simultaneously. Proper indication is required. Furthermore, the specification is not consistent with the reference characters provided in Figure 7. For example, the specification refers to channels 1-3, slots 1-10, and nodes/labels A-G while Figure 7 has labels ch1-ch3; s1-s10; and "A to D", "B to E", "C to F" and "C to G", respectively. Appropriate correction is required.
>
> The term "Netwrok" should be changed to the word "Network"(p. 9, line 20).
>
> The references to "node X" (p. 18, line 29 and line 30) are repetitive. Appropriate correction is required.
>
> The word "are" (p. 20, line 19) should be changed to "of".
>
> The term "tom" (p. 22, line 4) must be changed to a word(s), such as: to, from or to/from.

(Office Action dated July 31, 2002, pp. 3-4)

Applicants respectfully submit substitute paragraphs, as listed above, to overcome the objections. Applicants thank the Examiner for the suggestion to change "are" to "of" on page 20, but have opted to keep the existing wording.

The Examiner has objected to Claims 4, 7-9, 12 and 21 stand objected for having informalities. The Examiner has rejected Claims 4, 7-9, 11, 15, 18 and 20-22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states

> Claims 4, 7-9, 12 and 21 are objected to because of the following informalities: "comprising" (claim 4, line 5) should be changed to "comprises", "for" (claim 7, line 17) should be changed to "of", "to" (claim 8, line 11) should be inserted in between "node" and "said second", "send" (claim 9, line 15) should be changed to "sent", "or" (claim 9, line 16) should be changed to "of', "for" (claim 9, line 17) should be changed to "of', "noes" (claim 12, line 5) should be changed to "nodes" and "using" (claim 21, line 3) should be changed to "use". Appropriate correction is required.
>
> Claims 4, 7-9, 11, 15, 18 and 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly

point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "said time frame" in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "said second scheduling information" (line 10) in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites "said step of sending" in claim 6. Claim 6 recites two steps of sending: sending a schedule packet and sending an acknowledgement packet. It is unclear which of these steps of sending claim 7 is referring to. Appropriate correction is required.

Claim 8 recites "said hello packet" (line 12). It is unclear if this recitation is in reference to the hello packet in claim 7 or the immediately preceding second hello packet in the present claim. Appropriate correction is required.

Claim 9 recites the limitation "said value" (line 5) in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "said sequence of a last send schedule packet" in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites "said step of sending" in claim 6. Claim 6 recites two steps of sending: sending a schedule packet and sending an acknowledgement packet. It is unclear which of these steps of sending claim 9 is referring to. Appropriate correction is required.

Claim 11 recites the limitation "said wireless link" in claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitation "said time frame" in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitation "said second scheduling information" in the present claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 20 is unclear. Particularly, the multiple use of the term "with" (line 3 and line 4), combined with reference to the same phrase "said at least two collocated routers" (lines 1-2 and line 3) and without the use of commas or other syntax, is unclear.

Claim 21 is unclear. Particularly, the phrase "said at least two collocated routers and the plurality of routers and the plurality of non-collocated routers" is unclear.

Claims 21 and 22 recite the limitation "said plurality of frames transmit" in claim 21. There is insufficient antecedent basis for this limitation in the claim.

(Office Action dated July 31, 2002, pp. 4-6)

Applicants amended claims 1-22 as indicated in the marked-up version of the claims. Applicants made minor grammatical changes to all of the claims such as changing "said" to "the." Applicants amended claims 2, 4-9, 11, 12, 15, and 20 to better explain the inherent limitations with these claims. Applicants amended claims 4, 7-9, and 15 to improve the inherent antecedent basis for some of the limitations in those claims. Applicants amended claims 3, 5, 6, 20, 21, and 22 to redefined an existing limitation without narrowing the scope of the claim. Applicants reserve all rights with respect to the application of the doctrine equivalents. Applicants respectfully submit that claims 1-22, as amended, overcome the above objections and rejections.

The Examiner rejected claim 8 because "[c]laim 8 recites "said hello packet" (line 12). The Examiner stated "it is unclear if this recitation is in reference to the hello packet in claim 7 or the immediately preceding second hello packet in the present claim."

Claim 8, as amended, states

> 8. (Amended) The method of claim 7, wherein the hello packet comprises a first hello packet and the exchanging of scheduling information further comprises:
>
> receiving the hello-response at the first collocated node;
>
> resetting the sequence number of the last sent schedule packet to the larger of the sequence number of the last sent schedule packet or 1 plus the sequence number of the last received schedule packet received in the hello-response; and
>
> sending a second hello packet from the first collocated node to the second collocated node, the hello packet identifying the first collocated node and the sequence number of the last sent schedule packet as reset.

The limitation in claim 8 "wherein the hello packet comprises a first hello packet" refers to the hello packet limitation in claim 7.

The Examiner has rejected Claims 1, 2, 6-13, and 17 under 35 U.S.C. § 102(b) as being anticipated by Meier. The Examiner states that Meier discloses the following:

> Collocated nodes exchange scheduling information with one another over the second interface, wherein *the scheduling information is associated with transmissions* between the plurality of collocated nodes and each of the non-collocated nodes on the first interface. *The scheduling information determines a schedule (spanning tree, see Col. 3, lines 49-55)* for the plurality of collocated nodes for transmission between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the first interface.

(Office Action dated July 31, 2002, pp. 7) (emphasis added)

However, applicants respectfully submit that claim 1, as amended, is not anticipated under 35 U.S.C. § 102(b) by Meier. Claim 1, as amended, includes the following limitations:

> 1. A method, comprising:
> *scheduling transmissions* in a network including a plurality of collocated nodes and a plurality of non-collocated nodes, wherein the plurality of collocated nodes communicate between one another over a first interface and the plurality of non-collocated nodes communicate with the plurality of collocated nodes over a second interface;
> *exchanging scheduling information* between the plurality of collocated nodes over the first interface, and the *scheduling information associated with transmissions* between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface; and
> determining, based at least in part on the scheduling information, a *schedule for the plurality of collocated nodes for transmissions between* the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface, wherein the schedule includes information on when and in what order the transmissions may occur in the network.

(emphasis added)

The Examiner states, "The scheduling information determines a schedule (spanning tree, see Col. 3, lines 49-55) for the plurality of collocated nodes for

transmission." (Office Action dated July 31, 2002, pp. 7) Meier discloses that a spanning tree is a network topology map of pathways in which a given transmission may travel. Meier discloses:

> The optimal spanning tree, which provides the data pathways throughout the communication system, is stored and maintained by the network as a whole.

(Meier Col. 3 Lns. 49-50)

Meier also discloses:

> The transport entity in a node stores messages for possible retransmission. Note that retransmissions may not always follow the same path (primarily) due to moving terminals and the resulting changes in the spanning tree.

(Meier Col. 17 Lns. 63-67)

> To initialize the RF data communication system, the gateway 20 and the other nodes are organized into an optimal spanning tree rooted at the gateway 20. To form the optimal spanning tree, in the preferred embodiment the gateway 20 is assigned a status of ATTACHED and all other bridges are assigned the status UNATTACHED. The gateway 20 is considered attached to the spanning tree because it is the root node. Initially, all other bridges are unattached and lack a parent in the spanning tree. At this point, the attached gateway node 20 periodically broadcasts a specific type of polling packet referred to hereafter as "HELLO packets".

(Meier Col. 3, Lns. 56-68)

> The network layer organizes nodes into an optimal spanning tree with the controller at the root of the tree. (Note that the spanning three [tree] identifier allows two logical trees to exist in the same coverage area.) Spanning tree organization is facilitated with a HELLO protocol which allows nodes to determine the shortest path to the root before attaching to the spanning tree. All messages are routed along branches of the spanning tree.

(Meier Col. 12 Lns. 45-53)

Thus, Meier discloses organizing the nodes of a given network into an optimal network topology in the shape of a tree. After the establishment of the

current network topology occurs then a schedule could possibly be established to determine when and in what order the various transmissions may occur to the established nodes in that current network.

In contrast to Meier, claim 1 states "a schedule for transmissions between the plurality of nodes." Claim 1 further states "exchanging scheduling information between the plurality of collocated nodes over the first interface, and exchanging scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface." The spanning tree disclosed in Meier simply discloses the formation of a network topology without a timeframe or an order in which transmissions may occur to destinations within that network topology.

Meier does not disclose the limitations stated in claim 1. Therefore, claim 1, as amended, patentably distinguishes over Meier.

Given that claims 2-11 depend upon and include the limitations of claim 1, applicants respectfully submit that claims 2-11 also patentably distinguish over Meier.

Independent claim 12, as amended, states the following:

> 12. (Amended) A communications network, the network comprising:
> * * *
> the plurality of collocated nodes exchanges scheduling information with one another over the second interface, the scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the first interface, and determines, based at least in part on the scheduling information, a schedule for the plurality of collocated nodes for transmission between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the first interface.

As discussed above, Meier does not disclose the limitation of "exchanging scheduling information with one another over the second interface." Meier does not disclose the limitations of claim 12. Therefore, claim 12 patentably distinguishes over Meier.

Given that claims 13-17 depend upon and include the limitations of claim 12, applicants respectfully submit that claims 13-17 also patentably distinguish over Meier.

The Examiner has rejected claims 18-20 under 35 U.S.C. § 103(a) as being unpatentable over Meier and the Examiner's asserted common knowledge within the art. The Examiner states the following:

> [c]laims 18-20 are rejected for the same reasons as found in the rejections of claims 1 and 10 above with the inclusion that it would have been obvious to one of ordinary skill in the art to implement routers as the communicating entities for the network taught by Meier '436.

(Office Action dated July 31, 2002, pp. 12)

Independent claim 18, as amended, states the following:

> 18. (Amended) An apparatus in a communications network including
> * * * the at least two routers exchange scheduling information over the second interface, the scheduling information associated with transmissions between the at least two collocated routers and the plurality of non-collocated routers on the first interface, and wherein the at least two collocated routers determine, based at least in part on the scheduling information, a schedule for transmission between the at least two collocated routers and each of the plurality of non-collocated routers on the first interface.

As discussed above, Meier does not disclose the limitation of "exchange scheduling information over the second interface." Meier does not disclose the limitations of claim 18. Further, applicants respectfully disagree with the Examiner's

assertion that it would be obvious to one of ordinary skill in the art to implement routers as entities to communicate scheduling information associated with transmissions in the structural and functional relationship stated in claim 18. Per U.S. PTO guidelines, applicants respectfully request the Examiner to present documentary evidence that discloses this structural and functional relationship. Therefore, claim 18 patentably distinguishes over Meier and the Examiner's asserted common knowledge within the art.

Given that claims 19-21 depend upon and include the limitations of claim 18, applicants respectfully submit that claims 19-21 also patentably distinguish over Meier.

The Examiner has rejected dependant claims 3-5, 14-16 and 21-22 under § 103(a) as being unpatentable over Meier in view of Aaronson. However, as discussed above, applicants respectfully assert that Meier does not disclose or suggest the limitations in independent claim 1, independent claim 12, or independent claim 18. Applicants further assert that the combination of Aaronson and Meier does not disclose or suggest the limitations stated in claim 1, claim 12 or claim 18.

Independent claim 1 states "exchanging scheduling information between the plurality of collocated nodes over the first interface, and exchanging scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface." Aaronson does not disclose or suggest exchanging scheduling information between the plurality of collocated nodes over the first interface and exchanging scheduling

information between the plurality of non-collocated nodes on the second interface.

Aaronson discloses:

> The difficulty of implementing this system is the need to have an algorithm to control and synchronize the data transmission between the nodes based on their relative location with an available line of sight distance and an available link, as well as possible interference from burst data traffic originating and terminating at other nodes.

(Aaronson Col. 3 Lns. 10-15)

Aaronson does not make a distinction on exchanging scheduling information on a particular interface based upon the type of node. Rather, Aaronson exchanges scheduling information to nodes just based on their relative location. As discussed above, Meier does not disclose exchanging scheduling information on a particular interface based upon the type of node. Therefore, the combination of Aaronson and Meier does not disclose or suggest the exchange of scheduling information between the plurality of collocated nodes over the first interface and the scheduling information associated with transmissions between the plurality of collocated nodes, and each of the plurality of non-collocated nodes on the second interface. Therefore independent claim 1 patentably distinguishes over the combination of Aaronson and Meier because the combination does not teach or suggest the limitations stated in claim 1.

Given that claims 3-5 depend upon and include the limitations of claim 1, applicants respectfully submit that claims 3-5 also patentably distinguish over Meier in view of Aaronson.

Claim 12 states:

A communications network, the network comprising:

a plurality of non-collocated nodes, each of the plurality of non-collocated nodes capable of receiving and transmitting transmissions on a first interface; and * * *
the plurality of collocated nodes exchanges scheduling information with one another over the second interface, the scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the first interface.

Therefore, the combination of Aaronson and Meier does not disclose or suggest the exchange of scheduling information between the plurality of non-collocated nodes over the first interface, and exchanging the scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface. Therefore independent claim 12 patentably distinguishes over the combination of Aaronson and Meier.

Given that claims 14-16 depend upon and include the limitations of claim 1, applicants respectfully submit that claims 14-16 also patentably distinguish over Meier in view of Aaronson.

Independent claim 18, as amended, states the following:

18. (Amended) An apparatus in a communications network including
[t]he at least two routers exchange scheduling information over the second interface, the scheduling information associated with transmissions between the at least two collocated routers and the plurality of non-collocated routers on the first interface, and wherein the at least two collocated routers determine, based at least in part on the scheduling information, a schedule for transmission between the at least two collocated routers and each of the plurality of non-collocated routers on the first interface.

Neither Aaronson nor Meier disclose routers exchanging scheduling information. As previously discussed, neither Aaronson nor Meier discloses exchanging scheduling information on a particular interface based upon the type of

node. Therefore, the combination of Aaronson and Meier does not disclose or suggest the scheduling information associated with transmissions between the at least two collocated routers and the plurality of non-collocated routers on the first interface as well as at least two routers exchanging scheduling information over the second interface. Therefore independent claim 18 patentably distinguishes over the combination of Aaronson and Meier.

Given that claims 21-22 depend upon and include the limitations of claim 1, applicants respectfully submit that claims 21-22 also patentably distinguish over Meier in view of Aaronson.

It is respectfully submitted that in view of the amendments and remarks set forth herein, the rejections and objections have been overcome. An Information Disclosure Statement is also submitted with this amendment. Applicants reserve all rights with respect to the application of the doctrine equivalents. If there are any additional charges, please charge them to our Deposit Account No. 02-2666.

Respectfully submitted,
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification

Please substitute the following paragraph for the existing paragraph on page 11 lines 3-4.

(d) Each node receives an explicit acknowledgment 210 to its transmitted schedule from each collocated neighbor in a LAN or wired link.

Please substitute the following paragraph for the existing paragraph on page 18 line 17 through page 19 line 3.

As shown in Figure 3, when node Y (not shown) receives 340 a hello from a collocated neighbor X (not shown) in which the sequence number used by the sending node X (not shown) is smaller than the sequence number stored at the receiving node Y for the sending node, 340, then node Y sends a hello-response packet to node X specifying the sequence number and age locally available at node Y for its collocated neighbor X, 350. In turn, when node X receives through 324, 334, a hello-response packet addressed to it, 352, it increases its sequence number to equal the maximum of its current sequence number and one plus the sequence number received in the hello-response packet from node Y, 354; after that, node X sends a hello with the resulting sequence number, 356. If a hello-response is not received, 352, node X, and an ACK to CONET packet is received, 358, node X marks node Y as having sent the ACK 360. If an ACK is not received, 358, ~~node X~~ and if more data slots are available to receive appropriate CONETS packets, 362, node X determines whether map packets are to be received. Taking these steps

ensures that node X uses sequence numbers for its hello and schedule packets that all its collocated neighbors can assume to be the most recent from node X.

Please substitute the following paragraph for the existing paragraph on page 22 line 28 through page 23 line 9.

Consider the wireless network shown in Figure 1. Referring to Figure 7, ~~F~~for simplicity, the system is assumed to have three orthogonal channels, Ch1 - Ch3, and a frame is shown 30 as consisting of one control slot, s0, and 10 data slots, s1-s10. Figure 7 shows the scheduling information available at IR 180, is labeled node A. As the figure shows, node A has an established ASL with node ~~B~~ D in channel 1 lasting for slots 1 and 2. By means of CONETS schedule packets exchanged with its collocated neighbors IR 100 and IR 140, which are labeled B and C, respectively, node A also knows that there is an established ASL from node B to IR 160, which is labeled node E, on channel 2 during slots 1 through 3, an established ASL from node C to IR 130, labeled node F, in channel 3 during slots 4 to 8, and a proposed ASL from node ~~D~~ C to IR 110, labeled node G, over channel 2 during slots 9 and 10.

Please substitute the following paragraph for the existing paragraph on page 9, line 19 through page 10 line 15.

In one preferred embodiment of the present invention, CONETS is used in combination with ~~Netwrok~~ Network Established Transmission Scheduling (NETS) and Robust environmentally Aware Link and MAC (REALM), which are described in commonly assigned U.S. Patent Applications No. 09/418,899, filed October 15,1999 and No. 09/248,738 filed February 10, 1999, assigned to the Assignee of the

present invention and incorporated herein by reference. In this embodiment, REALM is used to determine when NETS schedule packets are sent periodically by each node, depending on its two-hop neighborhood. According to REALM, time is divided into frames of a known number of slots, and each frame is assigned a number that is known throughout the network. As illustrated in Figure 2, the first few slots of each frame 200 are dedicated to the transmission of NETS schedule packets, and such slots are called control slots 202. The rest of the frame 200 is used for the transmission of data; the slots in the remaining of the frame 200 are called data slots 204. CONETS packets are exchanged over a wired link or a LAN by collocated nodes during the time of the frame 200 assigned for the transmission of data over the wireless channels. The transmission of CONETS schedule packets 206 is accomplished using a channel access protocol suitable for the transmission media used to interconnect the collocated nodes; for example, if the LAN interconnecting the collocated nodes is an Ethernet, carrier sense multiple access with collision detection (CSMA/CD) is used for the transmission of CONETS packets over it. Figure 2 illustrates the case in which two of the collocated IRs in LAN 30 of Figure 1 send schedule packets 206 and one of them sends a hello packet 208 during a given frame; the figure also illustrates the fact that CONETS packets are not transmitted synchronously with respect to the frame assumed for the transmission of packets over the wireless channel available.

Please substitute the following paragraph for the existing paragraph on page 22, lines 3-6.

Etiquette Rule 11: A node can announce a new ASL to or from the node itself to~~m~~ its non-collocated neighbors only after all its collocated neighbors have agreed to include the ASL in the common transmission schedule maintained by all collocated nodes.

Please substitute the following paragraph for the existing paragraph on page 7, lines 22-30.

Figure 1 illustrates aspects on an exemplary ad hoc network with collocated nodes according to an embodiment of the invention. The ad hoc network depicted in the figure consists of a number of subnetworks ~~20,~~ 30, 40, 50, which provide an extension of the Internet through a number of internet radios (IRs) 100, 110, 120, 130, 140, 150, 160, 170, 180. Each IR 100-180 is a wireless router with an IP address and a MAC address. The ad hoc network attaches to the Internet 900 via an access point, called "AirHead," which comprises IR 110 interconnected to an Internet router 200 through local area network 40.

IN THE CLAIMS

Presented below are the amended claims. Claims 1-22 have been amended. Claim 23 has been added.

1. (Amended) A method, comprising:

~~for~~ scheduling transmissions in a network including a plurality of collocated nodes and a plurality of non-collocated nodes, wherein the plurality of collocated nodes communicate between one another over a first interface and the plurality of

non-collocated nodes communicate with the plurality of collocated nodes over a second interface; ~~, said method comprising the steps of:~~

exchanging scheduling information between the plurality of collocated nodes over the first interface;

exchanging ~~said~~ scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface; and

determining, based at least in part on ~~said~~the scheduling information, a schedule for the plurality of collocated nodes for transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface, wherein the schedule includes information on when and in what order the transmissions may occur in the network.

2. (Amended) The method of claim 1, further comprising: ~~wherein said step of exchanging scheduling information comprises~~ exchanging ~~said~~ scheduling information between the plurality of collocated nodes over ~~said~~the first interface during a time frame while the plurality of non-collocated nodes send data packets to, and receive data packets from, one or more ~~each~~ of the plurality of collocated nodes over the second interface.

3. (Amended) The method of claim 2, wherein ~~said~~the exchanging of scheduling information between the plurality of collocated nodes over the first interface ~~time frame comprises a first time frame and said step of determining comprises~~ occurs prior to the determining of athe schedule for the plurality of

collocated nodes for transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on the second interface~~, wherein said transmissions occur during a second time frame subsequent to said first time frame~~.

4. (Amended) The method of claim 1, wherein communications over the second interface are performed using a plurality of time frames, each comprising a control and data portion, ~~wherein said scheduling information comprises first scheduling information~~, wherein ~~said~~the ~~step of~~ exchanging of scheduling information ~~comprising exchanging said first scheduling information~~ over the first interface occurs during ~~said~~the data portion of ~~said~~a first time frame, and ~~wherein the method further comprises~~ the ~~the step of~~ exchanging of ~~second control~~scheduling information between the plurality of non-collocated nodes and each of the plurality of collocated nodes over the second interface occurs during ~~said~~the control portion of ~~said~~the first time frame~~, said second scheduling information associated with transmissions between the plurality of collocated and each of the plurality of non-collocated nodes~~.

5. (Amended) The method of claim 1, wherein ~~said~~the ~~step of~~ exchanging of scheduling information between the plurality of collocated nodes over the first interface comprises sending a schedule packet from ~~each of~~ a first ~~at least one~~ collocated node to ~~each of~~ a second ~~at least one~~ collocated node of ~~said~~the plurality of collocated nodes, ~~said~~the schedule packet including an indication of all known nodes in the two-hop neighborhood of ~~each of said~~the first ~~at least one~~ node, incoming and outgoing collision-free links of ~~each of said~~the first ~~at least one~~ node

that are already scheduled, time slots and data channels in which new links with ~~each of said~~the first ~~at least one~~ node can be reserved, and time slots and data channels on which ~~each of said~~the first ~~at least one~~ node will be listening while not active in scheduled links.

6. (Amended) The method of claim 1, wherein ~~said~~the ~~step of~~ exchanging of scheduling information between the plurality of collocated nodes over the first interface comprises ~~the steps of:~~:

sending a schedule packet from a first ~~at least one~~ collocated node of ~~said~~the plurality of collocated nodes to a second ~~at least one~~ collocated node of ~~said~~the plurality of collocated nodes over the first interface; and

sending, in response to receiving ~~said~~the schedule packet, an acknowledgement packet from ~~said~~the second ~~at least one~~ collocated node to ~~said~~the first ~~at least one~~ collocated node over the first interface.

7. (Amended) The method of claim 6, wherein ~~said~~the ~~step of~~ exchanging of scheduling information between the plurality of collocated nodes over the first interface further comprises ~~the steps of:~~:

setting, in ~~said~~the second ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~, a sequence number of a last received schedule packet to a value of a sequence number of ~~said~~the schedule packet received from ~~said~~the first ~~at least one~~ collocated node ~~of said plurality collocated nodes in said step of sending~~;

sending a hello packet from ~~said~~the first ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~ to ~~said~~the second ~~at least one~~ collocated node ~~of said~~

~~plurality of collocated nodes~~, ~~said~~the hello packet identifying ~~said~~the first ~~at least one~~ collocated node and a sequence number of a last sent schedule packet from ~~said~~the first ~~at least one~~ collocated node;

determining if ~~said~~the sequence number of ~~a~~the last sent schedule packet indicates that ~~said~~the sequence number of ~~a~~ the last sent schedule packet is less than ~~said~~the sequence number of ~~for~~ the~~a~~ last received schedule packet;

and, in response to a positive determination:

transmitting a hello-response from ~~said~~the second ~~at least one~~ collocated node to ~~said~~the first ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~, ~~said~~the hello-response including ~~said~~the sequence number for the~~a~~ last received schedule packet.

8. (Amended) The method of claim 7, wherein ~~said~~the hello packet comprises a first hello packet and ~~said~~the ~~step of~~ exchanging of scheduling information between the plurality of collocated nodes over the first interface further comprises ~~the steps of:~~:

receiving ~~said~~the hello-response at ~~said~~the first ~~at least one~~ collocated ~~node of said plurality of collocated nodes~~;

resetting ~~said~~the sequence number of ~~a~~the last sent schedule packet to the larger of ~~said~~the sequence number of ~~a~~the last sent schedule packet or 1 plus ~~said~~the sequence number of a last received schedule packet received in ~~said~~the hello-response; and

sending a second hello packet from ~~said~~the first ~~at least one~~ collocated node to ~~said~~the second ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~,

~~said~~the hello packet identifying ~~said~~the first ~~at least one~~ collocated node and ~~said~~the sequence number of ~~said~~the last sent schedule packet as reset ~~in said step of resetting~~.

9. (Amended) The method of claim 6, wherein ~~said~~the ~~step of~~ exchanging of scheduling information between the plurality of collocated nodes over the first interface further comprises ~~the steps of~~:

setting, in ~~said~~the second ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~, a sequence number of a last received schedule packet to ~~said~~a value of a sequence number of ~~said~~the schedule packet received from ~~said~~the first ~~at least one~~ collocated node ~~of said plurality of collocated nodes in said step of sending~~;

sending a hello packet from ~~said~~the first ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~ to a second ~~at least one~~ collocated node ~~of said plurality of collocated nodes~~, ~~said~~the hello packet identifying ~~said~~the first ~~at least one~~ collocated node and a sequence number of a last sent schedule packet from ~~said~~the first ~~at least one~~ collocated node;

determining if ~~said~~the sequence number of ~~a~~the last ~~send~~ sent schedule packet indicates that ~~said~~the sequence number ~~or~~ of ~~a~~ the last sent schedule packet is less than ~~said~~the sequence number of~~or~~ ~~a~~the last received schedule packet;

and, in response to a negative determination, setting ~~said~~the sequence number of ~~a~~ the last received schedule packet to ~~said~~the sequence number of ~~a~~ the last sent schedule packet.

10. (Amended) The method of claim 1, wherein ~~said~~the first interface comprises a wired link and ~~said~~the second interface comprises a wireless link.

11. (Amended) The method of claim 10, wherein ~~said~~the wireless link comprises a plurality of RF channels and the plurality of collocated nodes communicates with at least two of the plurality of non-collocated nodes simultaneously over orthogonal channels of ~~said~~the plurality of RF channels.

12. (Amended) A communications network, ~~said~~the network comprising:

a plurality of non-collocated nodes, each of ~~said~~the plurality of non-collocated nodes capable of receiving and transmitting transmissions on a first interface; and

a plurality of collocated ~~noes~~nodes, ~~said~~the plurality of collocated nodes each capable of communicating between one another over a second interface, each of ~~said~~the plurality of collocated nodes further capable of receiving and transmitting transmissions to and from ~~said~~the plurality of non-collocated nodes on ~~said~~the first interface, wherein ~~said~~the plurality of collocated nodes exchanges scheduling information with one another over ~~said~~the second interface, ~~said~~the scheduling information associated with transmissions between the plurality of collocated nodes and each of the plurality of non-collocated nodes on ~~said~~the first interface, and determines, based at least in part on ~~said~~the scheduling information, a schedule for ~~said~~the plurality of collocated nodes for transmission between ~~said~~the plurality of collocated nodes and each of ~~said~~the plurality of non-collocated nodes on ~~said~~the first interface.

13. (Amended) The network of claim 12, wherein ~~said~~the plurality of collocated nodes exchanges ~~said~~the scheduling information over ~~said~~the second interface during a time frame while ~~said~~the plurality of non-collocated nodes send data packets to, and receive data packets from, each of the plurality of collocated nodes over ~~said~~the first interface.

14. (Amended) The network of claim 13, wherein ~~said~~the time frame comprises a first time frame and wherein ~~said~~the schedule determined by ~~said~~the plurality of collocated nodes comprises a schedule for ~~said~~the plurality of collocated nodes for transmissions between ~~said~~the plurality of non-collocated nodes on ~~said~~the first interface, wherein ~~said~~the transmissions occur during a second time frame subsequent to ~~said~~the first time frame.

15. (Amended) The network of claim 12, wherein communications over ~~said~~the first interface are performed using a plurality of time frames, each comprising a control and data portion, wherein ~~said~~the scheduling information comprises a first scheduling information, wherein ~~said~~the plurality of collocated nodes exchanges ~~said~~the first scheduling information over ~~said~~the second interface during ~~said~~the data portion of ~~said~~a time frame, and wherein ~~said~~the plurality of collocated nodes further exchanges a second ~~control~~ scheduling information with each of ~~said~~the plurality of non-collocated nodes over ~~said~~the first interface during ~~said~~the control portion of ~~said~~the time frame, ~~said~~the second scheduling information

associated with transmissions between ~~said~~the plurality of collocated nodes and each of ~~said~~the plurality of non-collocated nodes.

16. (Amended) The network of claim 12, wherein ~~said~~the plurality of collocated nodes exchanges scheduling information comprising a schedule packet, ~~said~~the schedule packet including an indication of all known nodes in the two-hop neighborhood of a sending collocated node, incoming and outgoing collision- free links of ~~said~~the sending collocated node that are already scheduled, time slots and data channels in which new links with ~~said~~the sending collocated node can be reserved, and time slots and data channels on which ~~said~~the collocated node will be listening while not active in scheduled links.

17. (Amended) The network of claim 12, wherein ~~said~~the first interface comprises a wireless link and ~~said~~the second interface comprises a wired link.

18. (Amended) An apparatus in a communications network including a plurality of non-collocated routers capable of communicating over a first interface, ~~said~~the apparatus comprising:

at least two collocated routers, ~~said~~the at least two collocated routers capable of communications between one another over a second interface, and ~~said~~the at least two collocated routers capable of communications with each of the plurality of non- collocated routers over the first interface, wherein ~~said~~the at least two routers exchange scheduling information over ~~said~~the second interface, ~~said~~the scheduling information associated with transmissions between ~~said~~the at least two collocated

routers and the plurality of non-collocated routers on the first interface, and wherein ~~said~~the at least two collocated routers determine, based at least in part on ~~said~~the scheduling information, a schedule for transmission between ~~said~~the at least two collocated routers and each of the plurality of non-collocated routers on the first interface.

19. (Amended) The apparatus of claim 18, wherein the first interface comprises a wireless link and ~~said~~the second interface comprises a wired link.

20. (Amended) The apparatus of claim 19, ~~wherein said~~the at least two collocated routers exchange ~~said~~the scheduling information over ~~said~~the wired link at substantially the same time as ~~simultaneously with said~~the at least two collocated routers exchange ~~exchanging~~ data with the plurality of non-collocated nodes over ~~said~~the wireless link.

21. (Amended) The apparatus of claim 18, wherein ~~said~~the at least two collocated routers ~~and the plurality of routers~~ and the plurality of non-collocated routers communicating over the first interface ~~using~~ use a plurality of time frames, each of ~~said~~the plurality of time frames including a control portion and a data portion, and wherein ~~said~~the at least two collocated routers exchange ~~said~~the scheduling information over ~~said~~the second interface at approximately the same time that one or more frames associated with ~~substantially simultaneously with~~ the data portion of ~~a selected at least one frame of said~~the plurality of frames are transmitted ~~on~~ the first interface.

22. (Amended) The apparatus of claim 21, wherein ~~said selected at least one frame comprises a first selected at least one frame and wherein said~~the schedule for transmission between ~~said~~the at least two collocated routers and each of the plurality of non-collocated routers on the first interface occurs in a second frame that occurs subsequent to a first frame in which the exchange of schedule information on the second interface occurs~~comprises a schedule for transmission during a second selected at least one frame of said plurality of frames transmit subsequent to said first selected at least one frame~~.

23. (New) The method of claim 1, wherein the schedule for the plurality of collocated nodes for transmissions between the plurality of collocated nodes is a conflict-free transmission schedule.